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(54) METHOD OF PREVENTING FLEXIBLE FLAT CABLE FROM SAGGING IN FEEDING DEVICE FOR  
AUTOMOBILE SLIDE DOOR AND SAGGING PREVENTIVE STRUCTURE THEREFOR

(57) Abstract:

PROBLEM TO BE SOLVED: To provide a sagging preventive method and a sagging preventive structure capable of positively preventing flexible flat cables from sagging even when the flexible flat cables come to long in a feeding device for an automobile slider door, or the distance between their ends and their bending parts is lengthened.

SOLUTION: A structure for preventing flexible flat cables 25, 25 from sagging in a feeding device 31 for an automobile side door is provided with a slider rail 33 for constituting the feeding device 31, and a magnetizing part 32 for evolving magnetic force to the slider rail 33 and/or a bending auxiliary board 34 mounted on the flexible flat cables 25, 25 serving as circuit bodies and bent and housed in the slider rail 33 of the feeding device 31. The slider rail 33 is kept into contact with and held on the bending auxiliary board 34 through the magnetizing part 32 to employ the structure for preventing the flexible flat cables 25, 25 in the slider rail 33 from the sagging.

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## CLAIMS

## [Claim(s)]

[Claim 1] It forms with a laminated crookedness accessory plate characterized by comprising the following, Said slider rail and said crookedness accessory plate are contacted by magnetism, A hanging-down prevention method of a flexible flat cable in a feeder system of a slide door for cars making it hold and preventing that said flexible flat cable within said slider rail hangs down. A slider rail of the shape of a rail in which a feeder system of a slide door for cars which intervenes between slide doors attached so that a slide into the body and this body was possible is formed by either said body or said slide door. A slider held movable at this slider rail.

While having and constituting a circuit body by which it is cabled between said body and said slide door via inside of said slider rail, and one end is connected to an automobile body side circuit body, and the other end is connected to a slide door side circuit body, A monolayer which follows a portion cabled to said slider rail of said circuit body at movement concerning switching operation of said slide door of said slider, or a laminated flexible flat cable. This flexible flat cable is equipped and it is flexibility.

[Claim 2] In a hanging-down prevention method of a flexible flat cable in a feeder system of the slide door for cars according to claim 1, A contact surface to said crookedness accessory plate of said slider rail at least all or in part, Or said all or a part of contact surfaces of said slider rail and said crookedness accessory plate in part all or in part, [ said crookedness accessory plate ] \*\* -- a hanging-down prevention method of a flexible flat cable in a feeder system of a slide door for cars making one of portions magnetize by a magnetizing means among them.

[Claim 3] In a hanging-down prevention method of a flexible flat cable in a feeder system of the slide door for cars according to claim 2, said magnetizing means, To said portion, form with steel which is formed with a magnetic material and is permanent-magnet--ization-processed, and permanent-magnet--ization-process. \*\* which carries out spreading desiccation, and permanent-magnet--ization-processes powder or an application material which consists of magnetic materials, and sticks a magnetic light-gage tape -- a hanging-down prevention method of a flexible flat cable in a feeder system of a slide door for cars being either among them.

[Claim 4] It forms with a laminated crookedness accessory plate characterized by comprising the following, A contact surface to said crookedness accessory plate of said slider rail at least all or in part, Or said all or a part of contact surfaces of said slider rail and said crookedness accessory plate in part all or in part, [ said crookedness accessory plate ] \*\* -- a magnetizing part which produces magnetism into one of portions among them being provided, and said magnetizing part being passed, and said slider rail and said crookedness accessory plate, [ and ] Hanging-down preventive structure of a flexible flat cable in a feeder system of a slide door for cars making it hold and preventing that said flexible flat cable within said slider rail hangs down.

A slider rail of the shape of a rail in which a feeder system of a slide door for cars which intervenes between slide doors attached so that a slide into the body and this body was possible is formed by either said body or said slide door. A slider held movable at this slider rail.

While having and constituting a circuit body by which it is cabled between said body and said slide door via inside of said slider rail, and one end is connected to an automobile body side circuit body, and the other end is connected to a slide door side circuit body, A monolayer which follows a portion cabled to said slider rail of said circuit body at movement concerning switching operation of

said slide door of said slider, or a laminated flexible flat cable. This flexible flat cable is equipped and it is flexibility.

[Claim 5] In hanging-down preventive structure of a flexible flat cable in a feeder system of the slide door for cars according to claim 4, . Form with steel which forms said magnetizing part with a magnetic material, and permanent-magnet--ization-processes it, and permanent-magnet--ization-processes which carries out spreading desiccation, and permanent-magnet--ization-processes powder or an application material which consists of magnetic materials, and sticks a magnetic light-gage tape -- hanging-down preventive structure of a flexible flat cable in a feeder system of a slide door for cars forming by giving either among them.

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#### DETAILED DESCRIPTION

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##### [Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention is the method and structure which are related with hanging-down prevention of the circuit body cabled between the body of the feeder system of the slide door for cars, and a slide door. It is related with the method and structure of preventing a flexible flat cable hanging down by which crookedness accommodation is especially carried out into a slider rail].

[0002]

[Description of the Prior Art] Drawing 09 thru/or drawing 11 show the feeder system of the slide door for cars for which the applicant for this patent applied previously by Japanese Patent Application No. No. 94708 [ ten to ]. Hereafter, the feeder system is explained. In drawing 9 and drawing 10, the body of a high roof type car and 2 are the same, and 1 shows the slide door of the high roof type car. 3 shows the feeder system of the slide door for cars which intervenes between the body 1 and the slide door 2.

[0003] The doorway 5 is formed in the body 1 at the approximately center part of the vehicle body side wall part 4.

Step 6 is formed in the lower part of the doorway 5.

And the vehicle indoor floor 7 is formed on one step of Step 6.

[0004] Via the hinge roller part 8 which comprises the hinge body 8a (refer to drawing 10) provided in the slide door 2, and the roller part 8b (refer to drawing 10) under Step 6, The rail (not shown) for moving the slide door 2 to the cross direction of the body 1 so that slide opening and closing are possible has predetermined length, and is formed.

[0005] The feeder system 3 comprises:

The slider rail 9 of the shape of a rail provided in the slide door 2.

The slider 10 held movable at the slider rail 9.

The flexible arm 11 with which the shaft part 11b from which the shaft part 11a which is interlocked with movement of the slide door 2, bends and stretches, and becomes one end serves as the other end at the body 1 was attached to the slider 10 rotatable.

The circuit body 12 (refer to drawing 10 and drawing 11) by which it is cabled via the inside of the flexible arm 11, and the one end 12a is connected to the body side harness 13, and the other end 12b is connected to the slide door side harness 14.

[0006] The slider rail 9 is being fixed to the panel 15 of the slide door 2. As shown in drawing 11, the hollow part 16 to the circuit body 12 and the rail section 17 to the slider 10 are formed in the inside. The terminal block 18 which has the derivation port 18a to the other end 12b side

of the circuit body 12 is formed in the end part 16a of the hollow part 16. The terminal block 19 which serves as ejection prevention of the circuit body 12 is similarly formed in the other end 16b.

The seat 20 is formed in the terminal block 18. [0007] The three rollers 21 which roll the rail section 17 to the side part of the body part 10a are formed in the slider 10, respectively. The seat 22 is formed in the upper part of the body part 10a, and the shaft part 11b of the flexible arm 11 is attached to the lower part of the body part 10a.

[0008] The flexible arm 11 is a tubular body by which the circuit body 12 (refer to drawing 10) is cabled by the inside while movement of the slide door 2 is interlocked with and bending and stretching, as shown in drawing 9.

The shaft parts 11a and 11b provided in both ends, and the shaft part 11a, the product made of a synthetic resin allocated among 11b or the comparatively flexible outer tube 23 (refer to drawing 10) made of a synthetic rubber, It has the same product made of a synthetic resin or flexible inner tube made of a synthetic rubber (are the inside of the outer tube 23 and not shown), and is equipped with the metal mesh which is not illustrated between the outer tube 23 and said inner tube which is not illustrated.

[0009] The harness 24 which is cabled between said body 1 and the slide door 2 via the inside of the flexible arm 11 and the slider rail 9, and is connected to the body side harness 13 as the circuit body 12 is shown in drawing 10 and drawing 11, The flexible flat cables 25 and 25 (refer to drawing 11) of the two-sheet pile by which crookedness accommodation is carried out into the slider rail 9, It is drawn from the derivation port 18a of the terminal block 18, and the harness 26 connected to the slide door side harness 14 is comprised, The both ends, the harness 24, and the harness 26 of the flexible flat cables 25 and 25 are connected by the connector 28 provided in the terminal block 18 of the connector 27 and the slider rail 9 formed in the seat 22 of the slider 10.

[0010] To the flexible flat cables 25 and 25. The seat 20 of the slider rail 9 and the seat 22 of the slider 10 are equipped with the synthetic resin or the laminated crookedness accessory plate 29 made from a convex with which thread-fastening immobilization of the both ends was carried out (in being a product made from a convex, it has formed so that it may usually have a semilunar section). This crookedness accessory plate 29 has flexibility, and it carries out flattery movement, changing position bent with the flexible flat cables 25 and 25 with movement of the slider 10.

[0011] [Problem(s) to be Solved by the Invention] If it is in the above-mentioned conventional technology, as shown in drawing 11, by forming the crookedness accessory plate 29 to the flexible flat cables 25 and 25 in the slider rail 9, While resisting hauling and bending to the flexible flat cables 25 and 25, the flexible flat cables 25 and 25 can be prevented from lenticulating or hanging down.

[0012] However, if the migration length of the slider 10 becomes long in connection with the open operation of said slide door 2 (it contains also when the flexible flat cables 25 and 25 are long pictures), Since the interval of the end of the flexible flat cables 25 and 25 and a crooked part becomes large, (Receiving the above-mentioned product made from a convex) In the case of the flexible crookedness accessory plate 29 made of a synthetic resin, if it sees in the long run, it may produce hanging down from change of the rigidity and environmental temperature gradually (for example, as shown in the arrow A portion of drawing 12, hang down).

[0013] And if the flexible flat cables 25 and 25 and the crookedness accessory plate 29 hanging down arises within the slider rail 9, It becomes impossible for the flexible flat cables 25 and 25 and the crookedness accessory plate 29 to follow the slider 10, and we are anxious about becoming easy to cause the kink (kink) and a bite lump.

[0014] On the other hand, if the crookedness accessory plate 29 is made the above-mentioned product made from a convex, it is improvable, but since special processing and heat treatment are not needed and there is not necessarily a limit, there are some which are hard to be referred to as enough.

[0015] In view of the situation mentioned above, the flexible flat cable in the feeder system of the slide door for cars becomes a long picture, or this invention. Even when the interval of an end and a crooked part becomes large, let it be a technical problem to hang down with the hanging-down prevention method which can prevent certainly that a flexible flat cable hangs down, and to provide preventive structure.

[0016]

[Means for Solving the Problem] A hanging-down prevention method of a flexible flat cable in a feeder system of a slide door for cars of this invention according to claim 1 made in order to solve an aforementioned problem. A slider rail of the shape of a rail in which a feeder system of a slide door for cars which intervenes between slide doors attached so that a slide into the body and this body was possible is formed by either said body or said slide door. It is cabled by this slider rail between said body and said slide door via a slider held movable and inside of said slider rail, while having and constituting a circuit body by which one end is connected to an automobile body side circuit body, and the other end is connected to a slide door side circuit body. A monolayer which follows a portion cabled to said slider rail of said circuit body at movement concerning switching operation of said slide door of said slider, or a laminated flexible flat cable, It forms with a laminated crookedness accessory plate with which this flexible flat cable is equipped and which has flexibility. It is characterized by contacting, making said slider rail and said crookedness accessory plate hold by magnetism, and preventing that said flexible flat cable within said slider rail hangs down.

[0017] In the above-mentioned composition, a hanging-down prevention method of a flexible flat cable in a feeder system of a slide door for cars. A crookedness accessory plate with which a flexible flat cable as a circuit body by which crookedness accommodation is carried out into a slider rail which constitutes a feeder system, and a slider rail of the feeder system is equipped is contacted by magnetism. It was made to hold and a method of preventing a flexible flat cable within a slider rail hanging down is adopted. By adopting such a method, a flexible flat cable becomes a long picture, or, Since contact by magnetism of a slider rail and a crookedness accessory plate and maintenance will be added besides a function of a crookedness accessory plate which it has from the first even when an interval of an end of a flexible flat cable and a crooked part becomes large, A possibility of producing a flexible flat cable hanging down disappears. Therefore, since a flexible flat cable and a crookedness accessory plate will follow forever when moving a slider accompanying switching operation of a slide door, the kink (kink) and a bite lump can be prevented certainly.

[0018] A hanging-down prevention method of a flexible flat cable in a feeder system of a slide door for cars of this invention according to claim 2. In a hanging-down prevention method of a flexible flat cable in a feeder system of the slide door for cars according to claim 1, A contact surface to said crookedness accessory plate of said slider rail at least all or in part, all of said crookedness accessory plates -- or -- a part -- or said all or a part of contact surfaces of said slider rail and all of said crookedness accessory plates -- or -- a part -- \*\* -- it is characterized by making one of portions magnetize by a magnetizing means among them.

[0019] in the above-mentioned composition -- all of contact surfaces [ as opposed to a crookedness accessory plate at least ] of a slider rail -- or -- a part -- all of crookedness accessory plates -- or -- a part -- or said all or a part of contact surfaces of a slider rail and all of crookedness accessory plates -- or -- a part -- \*\* -- one of portions is made to magnetize by a magnetizing means among them. Therefore, while being able to accomplish contact by magnetism of a

slider rail and a crookedness accessory plate, and maintenance easily if the other party is made into steel since such a portion is made to magnetize by a magnetizing means, a portion suitably magnetized according to specification of a slide door or a feeder system can also be selected.

[0020] A hanging-down prevention method of a flexible flat cable in a feeder system of a slide door for cars of this invention according to claim 3, In a hanging-down prevention method of a flexible flat cable in a feeder system of the slide door for cars according to claim 2, said magnetizing means, \*\* which carries out spreading desiccation, and permanent-magnet--ization-processes powder or an application material which is formed with a magnetic material and is permanent-magnet--ization-processed to said portion, which is formed with steel and is permanent-magnet--ization-processed, and which consists of magnetic materials, and sticks a magnetic light-gage tape -- it is characterized by being either among them.

[0021]. In the above-mentioned composition, to a portion mentioned above, form a magnetizing means with a magnetic material and permanent-magnet--ization-process it. \*\* which carries out spreading desiccation, and permanent-magnet--ization-processes powder or an application material which is formed with steel and is permanent-magnet--ization-processed, and which consists of magnetic materials, and sticks a magnetic light-gage tape -- either is adopted among them. Therefore, in consideration of productivity and workability of a feeder system, a magnetizing means can be selected suitably.

[0022] Hanging-down preventive structure of a flexible flat cable in a feeder system of a slide door for cars of this invention according to claim 4 made in order to solve an aforementioned problem, A slider rail of the shape of a rail in which a feeder system of a slide door for cars which intervenes between slide doors attached so that a slide into the body and this body was possible is formed by either said body or said slide door, It is cabled by this slider rail between said body and said slide door via a slider held movable and inside of said slider rail, While having and constituting a circuit body by which one end is connected to an automobile body side circuit body, and the other end is connected to a slide door side circuit body, A monolayer which follows a portion cabled to said slider rail of said circuit body at movement concerning switching operation of said slide door of said slider, or a laminated flexible flat cable, It forms with a laminated crookedness accessory plate with which this flexible flat cable is equipped and which has flexibility, all of contact surfaces [ as opposed to said crookedness accessory plate at least ] of said slider rail -- or -- a part -- all of said crookedness accessory plates -- or -- a part -- or said all or a part of contact surfaces of said slider rail and all of said crookedness accessory plates -- or in part, \*\* -- it is characterized by passing said magnetizing part, contacting, making said slider rail and said crookedness accessory plate to provide a magnetizing part which produces magnetism into one of portions among them, and hold, and preventing that said flexible flat cable within said slider rail hangs down.

[0023] In the above-mentioned composition, hanging-down preventive structure of a flexible flat cable in a feeder system of a slide door for cars, A magnetizing part which produces magnetism is provided in one of the crookedness accessory plates with which a flexible flat cable as a circuit body by which crookedness accommodation is carried out into a slider rail which constitutes a feeder system, and a slider rail of the feeder system is equipped, or both, Passed the magnetizing part, and contacted, a slider rail and a crookedness accessory plate were made to hold, and structure of preventing a flexible flat cable within a slider rail hanging down is adopted. By adopting such a structure, a flexible flat cable becomes a long picture, or, Even when an interval of an end of a flexible flat cable and a crooked part becomes large, Since a magnetizing part which can accomplish contact by magnetism and maintenance will be provided in one of a slider rail and the crookedness accessory plates or both other than a function of a crookedness accessory plate which it has from the first, a

possibility of producing a flexible flat cable hanging down disappears. Therefore, since a flexible flat cable and a crookedness accessory plate will follow forever when moving a slider accompanying switching operation of a slide door, the kink (kink) and a bite lump can be prevented certainly.

[0024] Hanging-down preventive structure of a flexible flat cable in a feeder system of a slide door for cars of this invention according to claim 5, In hanging-down preventive structure of a flexible flat cable in a feeder system of the slide door for cars according to claim 4, . Form with steel which forms said magnetizing part with a magnetic material, and permanent-magnet--ization-processes it, and permanent-magnet--ization-processes which carries out spreading desiccation, and permanent-magnet--ization-processes powder or an application material which consists of magnetic materials, and sticks a magnetic light-gage tape -- it is characterized by forming by giving either among them.

[0025]. In the above-mentioned composition, form a magnetizing part with a magnetic material and permanent-magnet--ization-process it. \*\* which carries out spreading desiccation, and permanent-magnet--ization-processes powder or an application material which is formed with steel and is permanent-magnet--ization-processed, and which consists of magnetic materials, and sticks a magnetic light-gage tape -- it forms by giving either among them. Therefore, in consideration of productivity and workability of a feeder system, a magnetizing part can be formed suitably.

[0026] [Embodiment of the Invention] Hereafter, the 1 embodiment of this invention is described with reference to drawings. Drawing 1 is a perspective view of the feeder system in which the 1 embodiment of the hanging-down preventive structure of the flexible flat cable in the feeder system of the slide door for cars of this invention is shown. The explanatory view for drawing 2 to explain the sectional view of the slider rail of drawing 1, and for drawing 3 explain operation of the slide door of drawing 1, the flexible flat cable of drawing 2, and a crookedness accessory plate, as for the flexible flat cable of drawing 2, the perspective view of a crookedness accessory plate, drawing 4, or drawing 6 is shown. The same numerals are given to the fundamentally same members forming as a conventional example, and detailed explanation is omitted.

[0027] The slider rail 33 (it mentions later) which has the magnetizing part 32 which 31 shows the feeder system of the slide door for cars which intervenes between the body 1 and the slide door 2 in drawing 1, and is mentioned later, Contact maintenance is carried out by the magnetism which the crookedness accessory plate 34 (it mentions later) with which the flexible flat cables 25 and 25 similarly mentioned later were equipped produces in said magnetizing part 32, It has the structure where said flexible flat cables 25 and 25 do not hang down within said slider rail 33.

[0028] The slider rail 33 of the shape of a rail which has the magnetizing part 32 while the feeder system 31 is formed in the slide door 2, The slider 10 held movable at the slider rail 33 and movement of the slide door 2 are interlocked with, and bend and stretch, The flexible arm 11 (two or more arms may be connected) with which the shaft part 11b from which the shaft part 11a used as one end serves as the other end at the body 1 was attached to the slider 10 rotatable, It has the circuit body 12 (refer to drawing 2) by which it is cabled via the inside of the flexible arm 11 and the slider rail 33, and the one end 12a is connected to the body side harness 13, and the other end 12b (refer to drawing 2) is connected to the slide door side harness 14 (refer to drawing 2), and is constituted. As the conventional example explained, a vehicle body side wall part and 5 show a doorway, 6 shows a step, and, as for 4, 8 shows the hinge roller part.

[0029] The slider rail 33 is being fixed to the panel 15 of the slide door 2, and as shown in drawing 2, the hollow part 16 to the circuit body 12 and the rail section 17 to the slider 10 are formed in the inside. The terminal block 18 which

has the derivation port 18a to the other end 12b side of the circuit body 12 is formed in the end part 16a of the hollow part 16, and the terminal block 19 (refer to drawing 1) which serves as ejection prevention of the circuit body 12 is similarly formed in the other end 16b (refer to drawing 1). The seat 20 is formed in the terminal block 18.

[0030] While forming in the upper part of the slider rail 33 with magnetic materials (for example, ferrite etc.), the magnetizing part 32 which performed permanent magnet-ized processing is formed in it, and it is provided by one or a different body by appearance which forms the ceiling wall of the hollow part 16.

[0031] The three rollers 21 which roll the rail section 17 to the side part of the body part 10a are formed in the slider 10, respectively. The seat 22 is formed in the upper part of the body part 10a, and the shaft part 11b of the flexible arm 11 is attached to the lower part of the body part 10a.

[0032] The flexible arm 11 is a tubular body by which the circuit body 12 (refer to drawing 2) is cabled by the inside while movement of the slide door 2 is interlocked with and bending and stretching, as shown in drawing 1, and the shaft parts 11a and 11b are formed in both ends.

[0033] The harness 24 which is cabled between said body 1 and said slide door 2 via the inside of the flexible arm 11 and the slider rail 33, and is connected to the body side harness 13 (refer to drawing 1) as the circuit body 12 is shown in drawing 2. The flexible flat cables 25 and 25 of the two-sheet pile by which crookedness accommodation is carried out into the slider rail 33, It is drawn from the derivation port 18a of the terminal block 18, and the harness 26 connected to the slide door side harness 14 is comprised. The both ends, the harness 24, and the harness 26 of the flexible flat cables 25 and 25, It is connected by the connector 28 provided in the terminal block 18 of the connector 27 and the slider rail 33 formed in the seat 22 of the slider 10 (welding instead of what is restricted to connection by the connectors 27 and 28, etc. can use a means suitably).

[0034] The flexible flat cables 25 and 25 are equipped with the steel laminated crookedness accessory plate 34 with which thread-fastening immobilization of the both ends was carried out at the seat 20 of the slider rail 33, and the seat 22 of the slider 10. This crookedness accessory plate 34 has flexibility, and it carries out flattery movement, changing position bent with the flexible flat cables 25 and 25 with movement of the slider 10. In that case, contact maintenance will be carried out by the magnetism produced in the magnetizing part 32 of the slider rail 33, and there is no possibility of 34 crookedness accessory plate of hanging down with the flexible flat cables 25 and 25.

[0035] On the other hand, as shown in drawing 3, the projection 35 of plurality (a number and an interval shall be suitably set up according to condition of use) carries out for relativity, and is provided in the crookedness accessory plate 34 at the edges-on-both-sides part [ in alignment with the longitudinal direction of the flexible flat cables 25 and 25 ] 34a, and a [ 34 ] side.

[0036] The sectional shape which has the insert portion 36 is the narrow tabular piece formed in the shape of an L character, the projection 35 pierces the substrate 34b of the crookedness accessory plate 34 by press working of sheet metal, and integral moulding is carried out. The taper part 35a in consideration of the wearing nature of the flexible flat cables 25 and 25 is formed at the tip of the projection 35. Two or more 34c shows the punching hole.

[0037] When the crookedness accessory plate 34 tends to be equipped with the flexible flat cables 25 and 25 and you are going to make it support them, wearing of the direction of arrow P and the direction of arrow Q can be considered. First, in the case of the direction of arrow P, since either the flexible flat cables 25 and 25 or the crookedness accessory plate 34 is sagged crosswise, it comes to equip in the insert portion 36. Either the flexible flat cables 25 and 25 or the crookedness accessory plate 34 is made to slide, and, in the case of the direction of arrow Q, it comes (as for a case of which wearing and support) to equip in the insert portion 36. Of course, it can carry out simply and

promptly, and contributes to improvement in workability.

[0038] The both ends of the flexible flat cables 25 and 25, since it is connected to the connectors 27 and 28 (refer to drawing 2) as mentioned above, The amount of [ which is originally produced to said both ends when crooked ] (for example, if the flexible flat cables 25 and 25 of a two-sheet pile with which both ends are not being fixed are made crooked, gap will arise to both ends) gap. In the pars intermedia of the flexible flat cables 25 and 25, it becomes bending and will produce. However, since the projection 35 is had and formed for the interval in said longitudinal direction, the interval absorbs bending and does not pose a problem in particular.

[0039] In the above-mentioned composition, the feeder system 3 carries out operation as shown in drawing 4 thru/or drawing 6 in connection with the door opening operation (since door closing operation is the reverse of door opening operation, it is omitted) of the slide door 2. In order to explain operation of said flexible flat cables 25 and 25 and said crookedness accessory plate 34, these are transposed to the cable 37 with a crookedness accessory plate, and are explained.

[0040] At the time of door closing shown in drawing 4, the flexible arm 11 of the feeder system 3 is crooked acutely, and is maintaining contracted state in the corner (back side of the body 1) of Step 6. The slider 10 connected with the flexible arm 11 is located in the body 1 back side of the slider rail 33. The crooked part 37a of the cable 37 with a crookedness accessory plate by which crookedness accommodation was carried out into the slider rail 33 is located in the abbreviated omitted portion of the slider rail 33, and contact maintenance of about the abbreviation half of the overall length of said crookedness accessory plate 34 is carried out by said magnetizing part 32 in this state.

[0041] And the slide door 2 is opened, at the time of the half-opening door shown in drawing 5, movement of the slide door 2 is interlocked with, the slider 10 is guided via the slider rail 33 (it moves in the direction of the body 1 front), and the flexible arm 11 rotates in the direction of an arrow. In that case, the flexible arm 11 is extended a little. The position bent moves the crooked part 37a of the cable 37 with a crookedness accessory plate in the direction of the body 1 front. And in this state, contact maintenance only of a part for said crookedness accessory plate 34 to have moved in the direction of the body 1 front will be further carried out by said magnetizing part 32.

[0042] And further, the slide door 2 is moved to body back, and if an opened state as shown in drawing 6 is used, the flexible arm 11 will be interlocked with movement in said direction of the front of the slider 10, and will be mostly extended even in the right-angled state. The position bent moves further the crooked part 37a of the cable 37 with a crookedness accessory plate in the direction of the body 1 front. And in this state, contact maintenance only of a part for said crookedness accessory plate 34 to have moved in the direction of the body 1 front further will be carried out by said magnetizing part 32. Even if the position of the flection 37a of said crookedness accessory plate 34, i.e., the crooked part of the cable 37 with a crookedness accessory plate, fully moves in the direction of the body 1 front rather than the time of door closing, said crookedness accessory plate 34 has contact maintained by magnetism, and does not hang down.

[0043] As mentioned above, as explained referring to drawing 1 thru/or drawing 6, the flexible flat cables 25 and 25 become a long picture, or. The function which the crookedness accessory plate 34 has from the first even when the interval of the end of the flexible flat cables 25 and 25 and a crooked part becomes large (while holding by two or more projections 35) Since contact by the magnetism of the slider rail 33 and the crookedness accessory plate 34 and maintenance will be added to the others which prevent hanging down with rigidity, A possibility of producing a flexible flat cable hanging down will disappear, and the flexible flat cables 25 and 25 and the crookedness accessory plate 34 will follow forever when moving the slider 10 accompanying the switching operation of the slide door 2. Therefore, the kink (kink) and a bite lump can be prevented certainly.

[0044] Although the magnetizing part 32 explained while referring to drawing 2 had pointed out the whole upper part of the slider rail 33, not only this but the thing established selectively is possible. That is, it is possible to form the magnetizing part 32 in the shape of stripes to the upper part of the slider rail 33 etc. By forming the magnetizing part 32 in the slider rail 33 side, as above-mentioned, the crookedness accessory plate 34 can respond enough by using steel, and the effect that it becomes unnecessary to use the crookedness accessory plate made from a convex, and it can be dared to raise productivity also does it so.

[0045] The whole upper part or some of slider rail 33 is made into steel, and the thing of the crookedness accessory plate 34 for which the substrate 34b is made into a magnetizing part at least is also possible. That is, naturally it is also possible to perform permanent magnet-ized processing, while forming the substrate 34b with magnetic materials (for example, ferrite etc.), and to perform above-mentioned reverse. It is also possible to use the whole upper part of the slider rail 33 or a part, and the same magnetizing part as \*\*\*\* of the substrate 34b (refer to drawing 3) of the crookedness accessory plate 34.

[0046] Next, other 1 embodiments of the hanging-down preventive structure of the flexible flat cable in the feeder system of the slide door for cars of this invention are described, referring to drawing 7 and drawing 8. Except [ all ] crookedness accessory plate 38 explained below, since it is the same as that of the composition explained by the conventional example (refer to drawing 9 thru/or drawing 11), identical codes are attached and detailed explanation is omitted. Even if there are few slider rails 9, the upper part is steel and numerals 31' is given to this feeder system.

[0047] In drawing 7, the laminated crookedness accessory plate 38 is a product made of a synthetic resin, and while having flexibility and equipping the flexible flat cables 25 and 25, thread-fastening immobilization of the both ends is carried out at the seat 20 of the slider rail 9, and the seat 22 of the slider 10. The crookedness accessory plate 38 carries out flattery movement, changing position bent with the flexible flat cables 25 and 25 with movement of the slider 10.

[0048] Although the graphic display in particular has not been carried out to the crookedness accessory plate 38, to the field side over the flexible flat cables 25 and 25. The same projection and projected rim as the above-mentioned projection 35 are provided, and the light-gage tapes 39 and 39 of the plastic magnet as a magnetizing part are stuck on the field [ which becomes the reverse side of said field ], i.e., contact surface to the upper part of slider rail 9, side two sections along with the longitudinal direction.

[0049] In the above-mentioned composition, when the open operation of said slide door 2 is performed, as shown in drawing 8, the position of the crooked part of the crookedness accessory plate 38 will move in order of the arrow B, C, and D with movement of the slider 10. And on said light-gage tapes 39 and 39, the crookedness accessory plate 38 will contact the upper part of the slider rail 9, and will be held in it, and only a part for the crooked part to have moved will do so the same effect as \*\*\*\*.

[0050] Since said light-gage tapes 39 and 39 are stuck, the crookedness accessory plate 38 can be manufactured by non-magnetic materials (for example, aluminum, a copper alloy, a laminate material, etc.), and it can select suitably according to productivity.

[0051] Said light-gage tapes 39 and 39 are formed in the upper part of the slider rail 9, It is also possible to make the crookedness accessory plate 38 into steel things, and it is also possible to perform permanent magnet-ized processing for the powder or application materials of a magnetic material, such as a ferrite, after spreading desiccation (it also makes it contained to apply or join the magnetized substance). Naturally it is also possible to magnetize both the upper parts and crookedness accessory plates 38 of the slider rail 9 rather than to magnetize only one side. In the case of said light-gage tapes 39 and 39, the

upper part and the crookedness accessory plate 38 of the slider rail 9 can be manufactured by the synthetic resin material or the above-mentioned non-magnetic material.

[0052] Also in other one above embodiments, a kink and a bite lump can be certainly prevented like \*\*\*\*. The effect that it becomes unnecessary to use the crookedness accessory plate made from a convex, and it can be dared to raise productivity does so similarly.

[0053] in addition, the range into which this invention does not change the main point of this invention -- various -- change -- the feasible thing is natural.

[0054]

[Effect of the Invention] As explained above, according to this invention indicated to claim 1, the hanging-down prevention method of the flexible flat cable in the feeder system of the slide door for cars, The crookedness accessory plate with which the flexible flat cable as a circuit body by which crookedness accommodation is carried out into the slider rail which constitutes a feeder system, and the slider rail of the feeder system is equipped is contacted by magnetism, It was made to hold and the method of preventing the flexible flat cable within a slider rail hanging down is adopted. By adopting such a method, a flexible flat cable becomes a long picture, or, Since contact by the magnetism of a slider rail and a crookedness accessory plate and maintenance will be added besides the function of a crookedness accessory plate which it has from the first even when the interval of the end of a flexible flat cable and a crooked part becomes large, A possibility of producing a flexible flat cable hanging down disappears. Therefore, since a flexible flat cable and a crookedness accessory plate will follow forever when moving the slider accompanying the switching operation of a slide door, the effect that the kink (kink) and a bite lump can be prevented certainly is done so.

[0055] According to this invention indicated to claim 2, the contact surface to a crookedness accessory plate of a slider rail at least all or in part, all of crookedness accessory plates -- or -- a part -- or said all or a part of contact surfaces of a slider rail and all of crookedness accessory plates -- or -- a part -- \*\* -- one of portions is made to magnetize by a magnetizing means among them. Therefore, while being able to accomplish contact by the magnetism of a slider rail and a crookedness accessory plate, and maintenance easily if the other party is made into steel since such a portion is made to magnetize by a magnetizing means, The effect that the portion suitably magnetized according to the specification of a slide door or a feeder system can also be selected is done so.

[0056] According to this invention indicated to claim 3, a magnetizing means, \*\* which carries out spreading desiccation, and permanent-magnet--ization-processes which is formed with a magnetic material and the powder or application material which is formed with a magnetic material and is permanent-magnet--ization-processed to the portion mentioned above, which is formed with steel and is permanent-magnet--ization-processed, and which consists of magnetic materials, and sticks a magnetic light-gage tape -- either is adopted among them. Therefore, the effect that a magnetizing means can be suitably selected in consideration of the productivity and the workability of a feeder system is done so.

[0057] According to this invention indicated to claim 4, the hanging-down preventive structure of the flexible flat cable in the feeder system of the slide door for cars, The magnetizing part which produces magnetism is provided in one of the crookedness accessory plates with which the flexible flat cable as a circuit body by which crookedness accommodation is carried out into the slider rail which constitutes a feeder system, and the slider rail of the feeder system is equipped, or both, Passed the magnetizing part, and contacted, the slider rail and the crookedness accessory plate were made to hold, and the structure of preventing the flexible flat cable within a slider rail hanging down is adopted. By adopting such a structure, a flexible flat cable becomes a long picture, or, Even when the interval of the end of a flexible flat cable and a crooked part

becomes large, Since the magnetizing part which can accomplish contact by magnetism and maintenance will be provided in one of a slider rail and the crookedness accessory plates or both other than the function of a crookedness accessory plate which it has from the first, a possibility of producing a flexible flat cable hanging down disappears. Therefore, since a flexible flat cable and a crookedness accessory plate will follow forever when moving the slider accompanying the switching operation of a slide door, the effect that the kink (kink) and a bite lump can be prevented certainly is done so. [0058]. According to this invention indicated to claim 5, form a magnetizing part with a magnetic material and permanent-magnet--ization-process it.. \*\* which carries out spreading desiccation, and permanent-magnet--ization-processes the powder or application material which is formed with steel and is permanent-magnet--ization-processed, and which consists of magnetic materials, and sticks a magnetic light-gage tape -- it forms by giving either among them. Therefore, the effect that a magnetizing part can be suitably formed in consideration of the productivity and the workability of a feeder system is done so.

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#### DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is a perspective view of the feeder system in which the 1 embodiment of the hanging-down preventive structure of the flexible flat cable in the feeder system of the slide door for cars by this invention is shown.

[Drawing 2] It is a sectional view of the slider rail of drawing 1.

[Drawing 3] They are a flexible flat cable of drawing 2, and a perspective view of a crookedness accessory plate.

[Drawing 4] It is an explanatory view at the time of door closing for explaining operation of the slide door of drawing 1, the flexible flat cable of drawing 2, and a crookedness accessory plate.

[Drawing 5] It is an explanatory view at the time of door closing for explaining operation of the slide door of drawing 1 when a half-opening door is used from the state of drawing 4, the flexible flat cable of drawing 2, and a crookedness accessory plate.

[Drawing 6] It is an explanatory view at the time of door closing for explaining operation of the slide door of drawing 1 when door full admission is used from the state of drawing 5, the flexible flat cable of drawing 2, and a crookedness accessory plate.

[Drawing 7] It is a perspective view of the feeder system in which other 1 embodiments of the hanging-down preventive structure of the flexible flat cable in the feeder system of the slide door for cars by this invention are shown.

[Drawing 8] It is a sectional view of the slider rail of drawing 7.

[Drawing 9] It is a perspective view showing the feeder system of the slide door for cars of a conventional example.

[Drawing 10] It is a side view when drawing 9 is seen from the direction of the body front.

[Drawing 11] It is a sectional view of the slider rail of drawing 9.

[Drawing 12] It is a sectional view of the slider rail for explaining the state where the flexible flat cable has hung down within the slider rail of drawing 9.

[Description of Notations]

1 Body

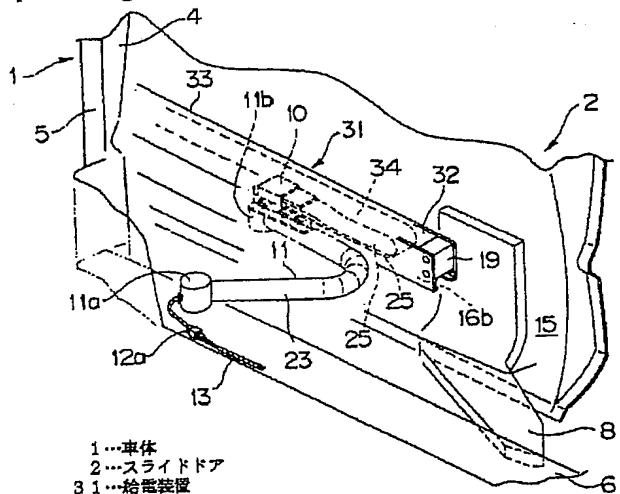
2 Slide door

10 Slider

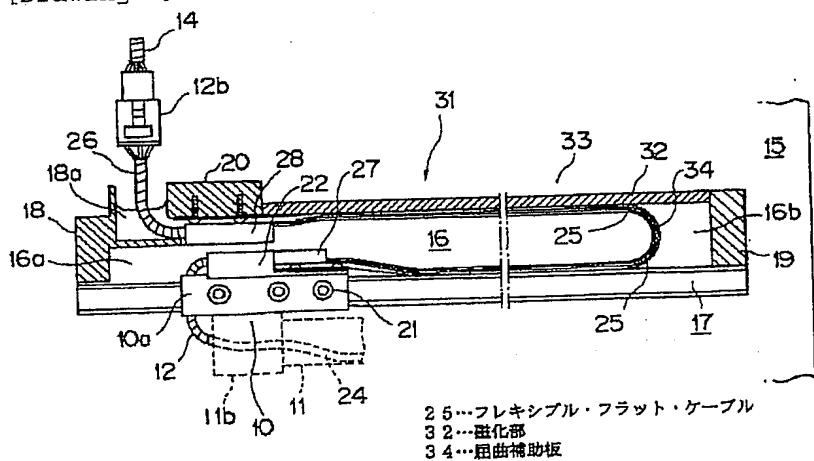
- 11 Flexible arm
- 12 Circuit body
- 13 Body side harness
- 14 Slide door side harness
- 25 Flexible flat cable
- 31 31' Feeder system
- 32 Magnetizing part
- 33 Slider rail
- 34 Crookedness accessory plate
- 35 Projection
- 36 Insert portion
- 37 A cable with a crookedness accessory plate
- 37a Crooked part
- 38 Crookedness accessory plate
- 39 Light-gage tape (magnetizing part)

## DRAWINGS

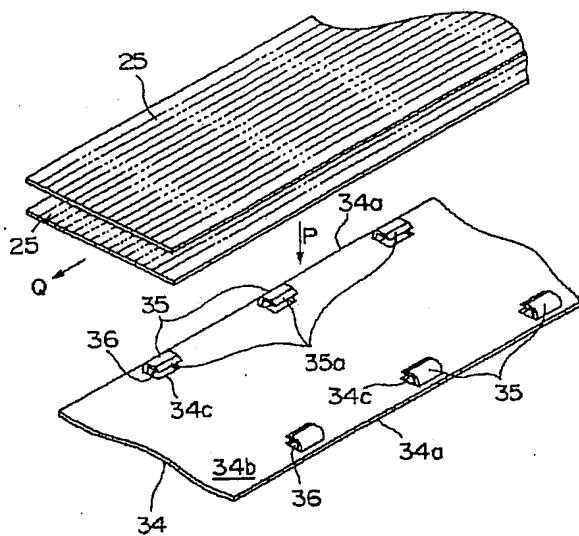
[Drawing 1]



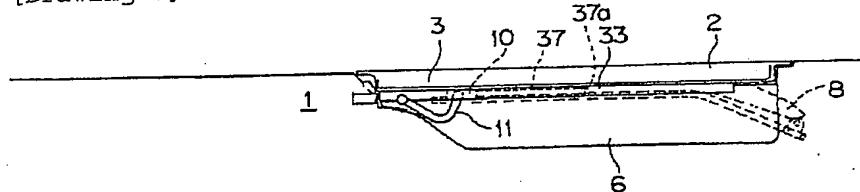
[Drawing 2]



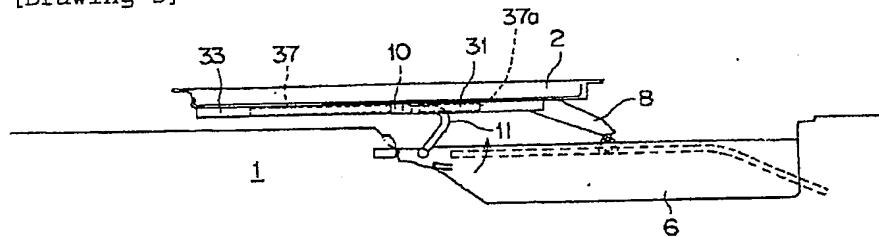
[Drawing 3]



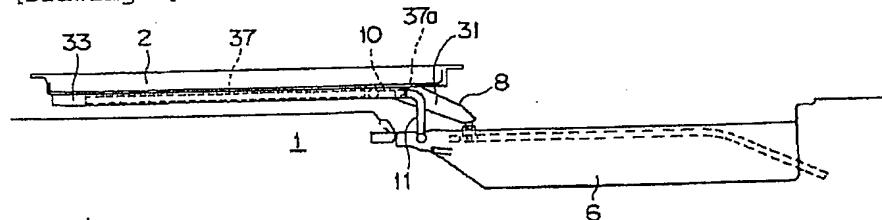
[Drawing 4]



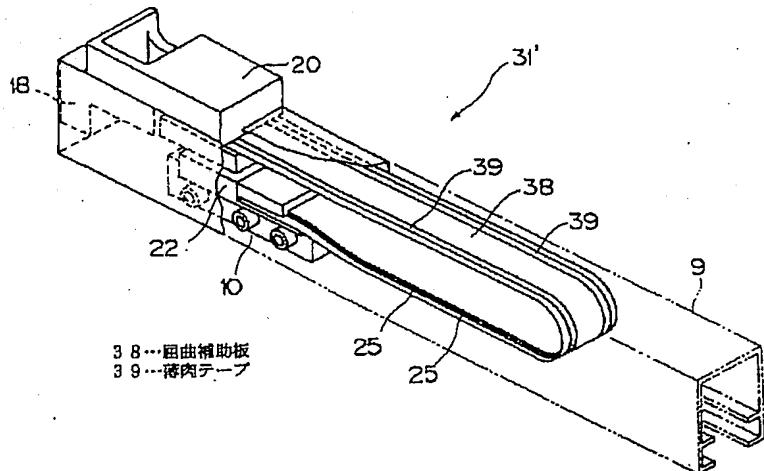
[Drawing 5]



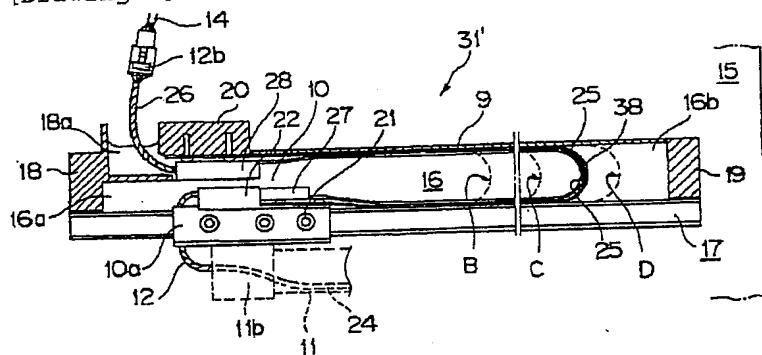
[Drawing 6]



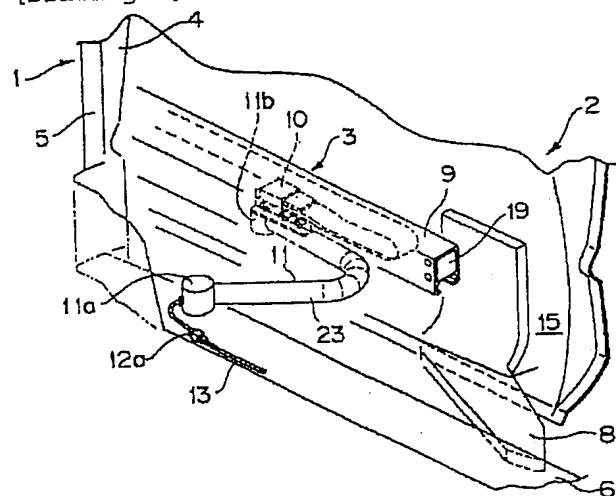
[Drawing 7]



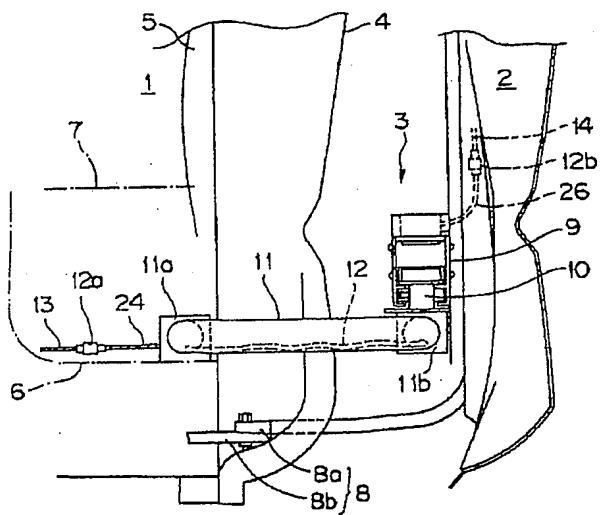
[Drawing 8]



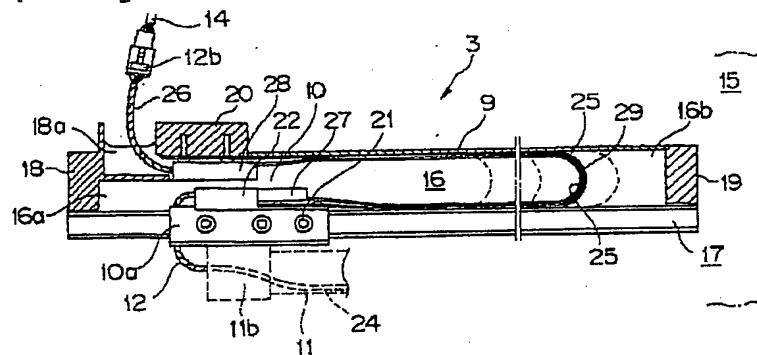
[Drawing 9]



[Drawing 10]



[Drawing 11]



[Drawing 12]

